

the Office is uncertain if the base substrate can be made of a material comprised by $C_6H_{12}O_6$, polyvinyl chloride, tantalum pentoxide or $LiAlO_2$ and suggests that the recitation of a "base substrate" may comprise any known material and therefore does not correspond with Applicant's scope of disclosure to the public. Similar rejections of these claims occur with respect to the buffer layer and the semiconductor layer. Specifically, the Office is alleging that the specific disclosure of several species in the application is not sufficient to support the generic recitation. Applicants respectfully disagree. First, to satisfy the written description requirement, a patent specification must describe the claimed invention in sufficient detail that one skilled in the art can reasonably conclude that the inventor had possession of the claimed invention. See, e.g., Moba, B.V. v. Diamond Automation, Inc., 325 F.3d. 1306, 1319, 66 USPQ2d 1429, 1438 (Fed. Cir. 2003) and MPEP 2163, Rev. 2, 2004, 2100-164.

There is a strong presumption that an adequate written description of the claimed invention is present when the application is filed. In re Wertheim, 541 F.2d 257, 263, 191 USPQ 90, 97 (CCPA 1976) and MPEP 2163 at 2100-166. Further, it is noted that the Office has the initial burden, after a thorough reading and evaluation of the content of the application, of presenting evidence or reasons why a person skilled in the art would not recognize that the written description of the invention provides support for the claims. See MPEP 2100-168. Additionally, information which is well known in the art need not be described in detail in the specification. See, e.g., Hybritech, Inc. v. Monoclonal Antibodies, Inc., 802 F.2d 1367, 1379-80, 123 USPQ 81, 90 (Fed. Cir. 1986) and MPEP 2163 at page 2100-172.

Finally, the written description requirement for a claim genus may be satisfied through a sufficient description of a representative number of species by disclosure of relevant identifying characteristics such as structure or other physical and/or chemical properties whereby functional characteristics coupled with known or disclosed correlation between functions and structure, or by combinations of such identifying characteristics that are sufficient to show that the Applicant was in possession of the claim genus. See, e.g., Regents of the University of California v. Eli Lilly, 119F.3d, 1559, 1568, 194 USPQ 470, 1406 (CCPA 1977) and MPEP 2163 at page 2100-174. The satisfactory disclosure of a "representative number" depends on whether one of ordinary skill in the art would recognize that the Applicant was in possession of the necessary common attributes or features of the elements possessed by the members of the genus in view of the species disclosed. See MPEP 2163 at page 2100-175.

With these principles in mind, Applicants respectfully address each of the rejections below.

"Base Substrate"

As the Office correctly points out, the base substrate is disclosed as being formed of sapphire or a silicon carbide at, for instance, page 5 lines 25 and 26. This base substrate has the common attributes of being able to be treated so as to form a first buffer layer thereon and to be able to be completely removed. The application of buffer layers and the removal of substrate material are both common expedients within the semiconductor arts for a wide variety of materials, and it is respectfully

submitted that one skilled in the art would know what types of materials were suitable for a base layer. Further, the disclosure of sapphire/silicon carbide clearly demonstrates that the Applicant had possession of the necessary common attributes or features of the elements possessed by members of the genus. Accordingly, Applicants respectfully submit that the disclosure is adequate. It is further noted that the first Office Action issued without this rejection thus indicating the Office's initial comfort with the scope of the disclosure.

"Buffer Layers"

The Office acknowledges that the specification is enabling for doped and undoped GaN buffer layers but suggests it does not provide enablement for any type of buffer layer. Actually, the specification is very clear in identifying that the buffer layer is disclosed as being a group III-V compound semiconductor layer for instance, and may be silicon-doped GaN layers or an undoped GaN layer, or a combination thereof. See methods 1 and 2 at pages 6 and 7, for instance. The other disclosed methods illustrate that the buffer layer can be made of several layers. There are several experimental examples as well which identify that the common attributes are that the buffer layer can be formed on a substrate and, at page 10, it is disclosed that the buffer layer can be different from the compound semiconductor layer and that another common attribute is that it can be removed together with the base substrate in some embodiments. Further, the buffer layer is designed to provide stress relief between the base substrate and the main substrate. All of these features are known attributes of buffer layers of a variety of types. Therefore, it would not be difficult for

one skilled in the art to come up with buffer layer in combination with selected substrate materials that would be adequate to fulfill these identified characteristics. Accordingly, it is respectfully submitted that the specification is fully adequate insofar as the specification amply demonstrates that the Applicant was in possession with the necessary common attributes or features of the elements possessed by the members of the genus in view of the species disclosed. The emphasis on the GaN material is simply that of an exemplary embodiment.

"Semiconductor Layer"

Like the buffer layer, the semiconductor layer is disclosed as being a group III-V compound semiconductor substrate, for instance. It is further disclosed that both compound and noncompound semiconductor substrates and other compound semiconductor substrates not mentioned in the specification can be used.

Finally, it is noted that at page 10 the Applicants are explicit in stating that the present invention may be embodied in many different forms and the embodiments described in the specification are merely illustrative and not intended to limit the scope of the invention. Multiple variations on the various embodiments are disclosed including two layer structures, multilayer structures, both alternating doped and undoped semiconductor material layers, etc. It seems clear that persons skilled in the art would believe that Applicants were in possession of the claimed invention at the time of filing the application.

Accordingly, each of the rejections based on 35 U.S.C. §112, first paragraph, are respectfully traversed and their withdrawal is earnestly solicited.

The Office Action includes a rejection of claims 1 and 3 under 35 U.S.C. §102(a) as allegedly being anticipated by JP2000-105321 to Toshiba. This rejection is respectfully traversed.

According to the machine generated translation of this publication, the disclosed optical waveguide element includes a sapphire substrate 10 upon which a buffer layer 11, a clad layer 12 and a quantum well layer 13 are formed. An InP cementing layer 22 is bonded to the quantum well layer 13 so that it can be attached to another substrate 20 via a layer of InGaAsP. Thereafter, the substrate 10 is removed.

This Japanese Patent Publication, however, does not meet each and every recitation of the claims, which is necessary for finding of anticipation under 35 U.S.C. §102(a). Specifically, claim 1 calls for *inter alia* after forming the semiconductor layer, removing the base layer such that the semiconductor layer is the final substrate. The Office identifies the semiconductor layer of claim 1 as being met by the clad layer 12 of this Japanese patent publication. However, a clad layer is not a substrate. In fact, substrate 20 of the resulting product is later attached as illustrated in Figure 1d and is disclosed as being made of InP.

Accordingly, Applicants respectfully submit that neither claims 1 or 3 are met by this Japanese Patent Publication.

The Office Action also includes a rejection of claims 1 and 3 as allegedly being anticipated by the *Nunoue et al.* patent (U.S. Patent No. 5,905,275). This rejection is also respectfully traversed.

The *Nunoue et al.* patent discloses a gallium nitride compound semiconductor light emitting device which includes a sapphire substrate 11 having a trench 11a into which is formed a buffer layer 12 and a compound semiconductor multiple layer 13. Later, a portion of the substrate is removed to expose the underside of the buffer layer 12 and multiple layer 13, as illustrated in Figures 1b and 1c.

However, the *Nunoue et al.* patent does not disclose, teach or suggest removing the base of substrates such that the semiconductor layer is the final substrate. The *Nunoue et al.* patent depends upon the substrate 11 continuing to exist for its operation, albeit there being a location which was removed to expose the underside of the multilayer 13 and buffer layer 12. Whether one can fairly describe the multiple layer 13 as a semiconductor layer, the *Nunoue et al.* device does not have a semiconductor layer that is a final substrate.

In light of the foregoing, Applicants respectfully request reconsideration and allowance of the above-captioned application. Should any residual issues exist, the Examiner is invited to contact the undersigned at the number listed below.

Respectfully submitted,

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